

## CLAIMS

1. A microwave generating apparatus comprising:

a magnetron having an anode and a cathode and oscillating by an  
5 electric current supplied to the anode, to thereby generate a microwave;

an electric-field controlling device for controlling at least one of a  
frequency / phase and an amplitude of the microwave, by changing an electric  
field; and

a magnetic-field changing device for stabilizing another of the  
10 frequency / phase and the amplitude of the microwave, by changing a  
magnetic field.

2. A microwave generating apparatus comprising:

a magnetron having an anode and a cathode and oscillating by an  
15 electric current supplied to the anode, to thereby generate a microwave;

an electric-field controlling device for controlling at least one of a  
frequency / phase and an amplitude of the microwave, by changing an electric  
field; and

a magnetic-field controlling device for controlling another of the  
20 frequency / phase and the amplitude of the microwave, by changing a  
magnetic field.

3. The microwave generating apparatus according to claim 1 or 2,  
further comprising: an injection locking device for controlling the frequency /  
25 phase of the microwave, by injecting a reference signal, which has a natural  
frequency close to a natural oscillation frequency of said magnetron, into said

magnetron, drawing an oscillation frequency of said magnetron into the frequency of the reference signal, and locking the oscillation frequency of said magnetron.